

## **FY-04-L(50)-124**

### **“Enhancing Carbon Reactivity in Mercury Control in Lignite-Fired Systems”**

CONTRACTOR: Energy & Environmental Research Center

PRINCIPAL INVESTIGATOR: Michael J. Holmes

#### **PARTICIPANTS**

<b><u>Sponsor</u></b>	<b><u>Cost Share</u></b>
Basin Electric Power Cooperative	\$146,109
Great River Energy	\$ 68,520
Minnkota Power Cooperative	\$ 5,337
Ottertail Power Cooperative	\$ 3,982
Montana Dakota Utilities	\$ 2,532
SaskPower	\$153,850
Falkirk Mine	\$ 4,440
Westmoreland	\$ 4,440
BNI	\$ 4,440
Coteau Mine	\$ 4,440
ADA-ES	\$282,500
B&W	\$111,794
URS	\$ 45,849
NDIC	\$600,000
DOE	<u>\$4,155,462</u>
Total Cost	\$5,732,195

#### **Project Schedule - 36 Months**

Contract Date – 2/15/04

Start Date – 2/15/04

Completion Date – ~~9/30/06~~

Extended to – 12/31/06

#### **Project Deliverables**

Contract signed: ✓

Quarterly Reports: 12/31/03 (✓)

3/31/04(✓);6/30/04(✓);9/30/04(✓);

12/31/04(✓);3/31/05(✓);6/30/05(✓);

9/30/05(✓);12/31/05(✓);

3/31/06(✓);6/30/06( )

Final Report: 9/30/06( )

#### **OBJECTIVE / STATEMENT OF WORK**

Substantially enhance the capability of carbon sorbents to remove Hg from lignite flue gases to achieve a high level of cost-effective control. The enhancement processes have been proven at the pilot scale and in limited full-scale tests. The work proposed here focuses on full-scale testing at

four lignite-fired units: Leland Olds Station Unit 1 (ESP), Stanton Station Units 1 (ESP) and 10 (spray dryer-baghouse), and Antelope Valley Station Unit 1 (spray dryer-baghouse).

## **STATUS**

### Oct – Dec 2003 Quarterly Report

Contract negotiations with the DOE-NETL and NDIC were completed. Near-term focus will be on preparations for large-scale mercury control tests at the Leland Olds Station to begin in March and at the Stanton Station. Testing will be conducted in parallel.

### Jan – Mar 2004 Quarterly Report

Preparation for field activities at the LO Station took place up to the on-site arrival of field crews in mid-March. Field installation of the powered activated carbon injection system was initiated and completed. On-site activities related to the sampling effort began in March. Baseline testing began on March 31, 2004.

### Apr – June 2004 Quarterly Report

Field testing at the Leland Olds Station has been completed. Long-term testing was carried out with a PAC rate of 3 lb./Macf and the equivalent of 500 ppm chloride addition to the coal. Initial observations indicate that the target mercury removal rate of 55% was obtained for the test period. Data reduction has been initiated and is on-going. Parametric tests at the Stanton Station were completed. A one-month test program is on-going. A summary overview of the field test were presented at the NETL Contractor Mercury Review Meeting on July 14-15, 2004.

### July – September, 2004 Quarterly Report

Field testing at the Leland Olds Station has been completed. Plant operation parameters did not appear to be affected by sorbent injection. Preliminary data from month long tests indicated a decrease in performance of about 20% as certain system parameters change.

### September – December, 2004 Quarterly Report

Data reduction and reporting was continued for previous tests at the LO Station and Stanton Unit 10. The site specific test plan for AVS is on-going, with field tests anticipated to begin in February, 2005

### January – March, 2005 Quarterly Report

Data reduction and reporting is continued for the tests performed at the Leland Olds Station Unit 1 and Stanton Station Unit 10. Tests at the Antelope Valley Station Unit 1 began in January and are on-going. Baseline and parametric tests were conducted using both a sorbent enhanced additive and with powdered activated carbon. A month long test will be conducted.

### April – June, 2005 Quarterly Report

Test conducted at the Leland Olds plant is completed. Long-term tests using a PAC rate of 3 #/Macf & calcium chloride reduced mercury emissions to the target of 55%. Balance –of-plant analyses are on-going.

Stanton Station tests are completed and a data site report is being prepared. Tests at the Antelope Valley plant were complete & data reduction is on-going.

A test plan was prepared and distributed to project participants for testing at Stanton Station Unit 1.

July – September, 2005 Quarterly Report

Testing at the Leland Olds Plant, Stanton Station 10 & 1, and Antelope Valley Station were completed during the previous quarter. The data is being compiled into a site (each plant) report with a draft report prepared later in 2005.

October1 – December 31, 2005

Month-long testing at Stanton Station (SS) 1 was completed, and analysis, data reduction, and reporting are ongoing. Reporting continued for the tests performed at Leland Olds Station 1, SS10, and Antelope Valley Station 1.

January 1 – March 31, 2006

Testing has been completed. Analysis, data reduction, and report writing are ongoing for the tests performed at Leland Olds Station 1, SS10, and Antelope Valley Station 1. The reporting of results are to be completed in the next quarter.